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In the Supreme Court of the United States

COMMONWEALTH OF MASSACHUSETTS, ET AL.,

Petitioners.

v.

ENVIRONMENTAL PROTECTION AGENCY, ET AL.,

Respondents.

On Writ of Certiorari to the United States Court of Appeals for the District of Columbia Circuit

BRIEF OF WILLIAM J. BAUMOL, ROBERT W. CRANDALL, ROBERT W. HAHN, PAUL L. JOSKOW, ROBERT E. LITAN, AND RICHARD L. SCHMALENSEE AS *AMICI CURIAE* IN SUPPORT OF RESPONDENTS

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QUESTION PRESENTED

Amici will address the following question:

Whether the Environmental Protection Agency's denial of the petition to regulate emissions of greenhouse gases from motor vehicles under Section 202(a) of the Clean Air Act was reasonable in light of the global nature of greenhouse gas emissions and the likely superiority of other methods for combating greenhouse gases.

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INTEREST OF THE *AMICI CURIAE*[1]

Amici are economics professors and scholars who have expertise and write and teach on public policy, regulatory economics, and the economics of environmental policy.

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[1] All parties have consented to the filing of this brief. Pursuant to this Court's Rule 37.6, *amici* state that no counsel for any party in this case authored this brief in whole or in part. The following non-parties made monetary contributions for the preparation and submission of this brief: Arizona Automobile Dealers Association; Automobile Dealers Association of Alabama; Automobile Dealers Association of Greater Philadelphia; California Motor Car Dealers Association; Chicago Automobile Trade Association; Colorado Automobile Dealers Association; Detroit Auto Dealers Association; Eastern New York Coalition of Automotive Retailers, Inc.; Florida Automobile Dealers Association; Georgia Automobile Dealers Association; Greater Cleveland Automobile Dealers' Association; Illinois Automobile Dealers Association; Iowa Automobile Dealers Association; Kansas Automobile Dealers Association; Kentucky Automobile Dealers Association; Maine Automobile Dealers Association, Inc; Maryland Automobile Dealers Association; Massachusetts State Auto Dealers Association, Inc.; Metro Denver Automobile Dealers Association; Metro Portland New Car Dealers Association; Michigan Automobile Dealers Association; Missouri Automobile Dealers Association; New Hampshire Automobile Dealers Association; New Jersey Coalition of Automotive Retailers; New Mexico Automotive Dealers Association, New York State Automobile Dealers Association; Niagara Frontier Automobile Dealers Association; North Carolina Automobile Dealers Association; Ohio Automobile Dealers Association; Oklahoma Automobile Dealers Association; Oregon Automobile Dealers Association; Pennsylvania Automotive Association; Rochester Automobile Dealers' Association, Inc.; Silicon Valley Auto Dealers Association; South Carolina Automobile Dealers Association; Tennessee Automotive Association; Texas Automobile Dealers Association; Utah Automobile Dealers Association; Vermont Automobile Dealers Association; Virginia Automobile Dealers Association; Washington Area New Automobile Dealers Association; Wisconsin Automobile and Truck Dealers Association.

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Amici file solely as individuals and not on behalf of any institutions with which they are affiliated.

INTRODUCTION AND SUMMARY

Climate change poses serious environmental, social, and economic issues that should not be neglected. The urgency of these issues, however, should not obscure the fact that there are better and worse policy instruments for responding to this global problem.

This case arises from the D.C. Circuit's denial of a petition for review that challenged the refusal by the United States Environmental Protection Agency ("EPA") to engage in rulemaking to regulate "Greenhouse Gas Emissions from New Motor Vehicles Under § 202 of the Clean Air Act." Petition for Rulemaking at JA 5.[2] Section 202 directs the Administrator to prescribe "by regulation * * * standards applicable to the emission of any air pollutant from any class or classes of new motor vehicle or new motor vehicle engines, which, in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." 42 U.S.C. § 7521(a)(1). EPA denied the petition, based in part on its determination that, having regard to "public health or welfare," "setting [greenhouse gas] emission standards is not appropriate at this time." Pet. App. A67. The D.C. Circuit, in a lead opinion by Judge Randolph, held that, in weighing "'policy' considerations" relevant to the public health and welfare to deny the petition, the "EPA Administrator properly exercised his discretion under § 202(a)(1)." Pet. App. A14, A15.

The rulemaking petition sought the *regulation* of GHGs under Section 202(a) of the CAA, 42 U.S.C. § 7521(a)(1), rather than just a determination that carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons are air pollutants within the meaning of Section 302(g), 42 U.S.C. § 7602(g). See JA 5, 6-7, 15, 16, 21-44. The court of appeals recognized that the petition for rulemaking sought regulation of GHGs. See Pet. App. A11 ("Petitioners sought to have EPA regulate, under § 202(a)(1) of the Clean Air Act, carbon dioxide (CO_2) and three other greenhouse gases: methane (CH_4), nitrous oxide (N_2O), and hydrofluorocarbons (HFCs)").

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[2] Throughout the remainder of this brief, we use the abbreviations "GHG" to refer to greenhouse gases and "CAA" to refer to the Clean Air Act.

EPA rested its decision not to regulate GHGs on a number of considerations. First, the agency stated that, "[b]ased on a thorough review of the CAA, its legislative history, other congressional action and Supreme Court precedent, EPA believes that the CAA does not authorize regulation to address global climate change." Pet. App. A67 (footnote omitted); see also *id.* at A68-A78. EPA also concluded that, even if it was authorized to regulate carbon dioxide under the CAA, "Congress has not authorized the Agency to regulate CO_2 emissions from motor vehicles to the extent such standards would effectively regulate car and light truck fuel economy, which is governed by a comprehensive statute administered by DOT." *Id.* at A67; see also *id.* at A77, A79-A80.

EPA also cited a number of policy considerations that counseled against the regulatory action sought by the petitioners. Specifically, EPA referred to the potential for conflict with existing White House policies and initiatives (Pet. App. A67-A68), as well as concerns about the foreign policy implications of the regulation. *Id.* at A68; see also *id.* at A85-A87.

In addition EPA stated that, even if the Administrator were to "find that GHGs, in general, may reasonably be anticipated to endanger public health or welfare" (Pet. App. A81), the agency would have the discretion not to regulate. EPA stated that "[d]epending on the particular problem, motor vehicles may contribute more or less or not at all. An important issue before the Administrator is whether, given motor vehicles' relative contribution to a problem, *it makes sense to regulate them.* * * * The discretionary nature of the Administrator's section 202(a)(1) authority allows her to consider these important policy issues and decide to regulate motor vehicle emissions as appropriate to the air pollution problem being addressed." *Ibid.* (emphasis added). EPA concluded that "[w]e do not believe * * * that it would be either effective or appropriate for EPA to establish GHG standards

for motor vehicles at this time" (*id.* at A82), noting, among other things, that establishing GHG emission standards for U.S. motor vehicles would "result in an inefficient, piecemeal approach to addressing the climate change issue." *Id.* at A85.

It is this policy judgment that we address in this brief. In doing so, we offer our perspective as economists, focusing on whether, when considered through the prism of basic economic principles, it makes sense to regulate GHGs – particularly carbon dioxide – under Section 202(a) of the CAA.[3] We conclude that the regulatory proposals made by the petitioners before EPA are likely to have significant adverse impacts and that there are alternative regulatory mechanisms for reducing carbon dioxide emissions that are likely to be much more cost-effective than the regulatory mechanisms provided by Section 202(a).[4]

The petitioners before EPA requested that carbon dioxide emissions from motor vehicles be regulated through performance standards involving either Corporate Average Fuel Economy ("CAFE") regulations or a zero-emission-vehicle

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[3] Our focus on carbon dioxide mirrors the overriding focus on carbon dioxide in the petition itself – a focus discerned by the court of appeals. See Pet. App. A11 n.2 ("[t]he rulemaking request and the papers submitted to this court focus on the effects of CO_2"). As EPA observed in its decision document, although the petitioners suggested a number of ways of reducing carbon dioxide emissions, "[p]etitioners do not, however, address the potential for reducing motor vehicle emissions of the other three [greenhouse gases]." Pet. App. A62; see also Pet. App. A87 ("With respect to the other GHGs – CH_4, N_2O, and HFCs – petitioners make no suggestion as to how these emissions might be reduced from motor vehicles").

[4] A policy is said to be more "cost-effective" than another if it can achieve the same overall goal, such as a specified reduction in pollution, at a lower cost. See HARVEY S. ROSEN, PUBLIC FINANCE 257 (7th ed. 2005). "Net benefits" are simply benefits minus costs.

("ZEV") mandate.[5] In response to the petitioners' position before EPA, we first discuss the problems inherent in attempts to address a global commons issue like greenhouse warming by regulating locally on an individual sector basis. Next, we discuss the adverse consequences that would result from CAFE regulations and ZEV requirements, which, as noted above, are the principal regulatory actions sought by petitioners before EPA. Finally, we discuss the widespread preference among economists for regulatory mechanisms that are more cost-effective and that provide more flexibility than standard-setting regulations, such as those proposed by the petitioners before EPA.

Our conclusion is that regulation of carbon dioxide under Section 202(a) is likely to bring with it a number of adverse consequences. This does not mean that policies to control greenhouse gases should be rejected out of hand. Rather, our view is that the use of the regulatory mechanisms afforded by Section 202(a) is insupportable and that there are other more cost-effective policy options for addressing GHGs that should be considered instead. In particular, economists generally consider incentive-based mechanisms, such as carbon taxes or marketable permits for carbon reduction, to be much more likely to yield net benefits than would performance-based standards, such as those proposed by petitioners before the agency. Accordingly, EPA's decision not to regulate under Section 202(a) was reasonable.

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[5] That CAFE and ZEV regulation were the principal regulatory options proposed by petitioners is clear from the petition for rulemaking. See JA 36-38, 39-41. EPA recognized this, as well. See Pet. App. A87. EPA noted that petitioners also proposed "tire efficiency standards," but dismissed such a suggestion as irrelevant to the setting of "'standards applicable to the *emission*' of an air pollutant from a motor vehicle under section 202(a)(1)." *Ibid.* (quoting Section 202(a)(1)).

ARGUMENT

We begin with some basic principles to which economists generally subscribe. First, other things being equal, economic principles favor the choice of regulatory options that are more cost-effective than alternative regulatory options. Economists also recognize that regulatory policies that provide regulated entities with flexibility in choosing ways to meet regulatory goals are likely to yield higher net benefits than policies that do not afford flexibility to the regulated entities. Flexibility in regulatory schemes allows regulated entities to tailor their compliance efforts to their particular circumstances, enhancing the likelihood that they will choose cost-effective methods of compliance, as well as facilitating innovation.

I. GREENHOUSE GAS EMISSIONS ARE A GLOBAL PROBLEM THAT DOES NOT LEND ITSELF TO LOCAL, SINGLE-SECTOR SOLUTIONS.

The abatement of greenhouse gases presents a classic "tragedy-of-the-commons" problem. See Garrett Hardin, *The Tragedy of the Commons*, 162 SCIENCE 1243 (1968). In the tragedy-of-the-commons, individual members of a community make excessive use of a common area because they do not take into account the costs that their individual uses impose on others. As Hardin described it:

> Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. * * *
>
> As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks "What is the utility *to me* of adding one more animal to my herd?" This utility has one negative and one positive component.
>
> (1) The positive component is a function of the increment of one animal. Since the herdsman re-

> ceives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.
>
> (2) The negative component is a function of the additional overgrazing created by one more animal. Since, however, the effects of overgrazing are shared by all the herdsmen, the negative utility for any particular decision-making herdsman is only a fraction of -1.
>
> Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit – in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all.

Id. at 1244.

The case of GHG emissions presents a tragedy-of-the-commons if individuals and firms are not appropriately charged the full social cost that their emissions imposes on others. Appropriate charges for GHG-emissions, and subsidies for actions that reduce such emissions, can help achieve the economically efficient level of GHGs – that is, the level at which the marginal benefit of reducing an additional increment of GHG emissions just equals the marginal cost of reducing that increment.

Like other tragedy-of-the-commons problems, GHG emissions are not efficiently solved in a piecemeal fashion. In denying the rulemaking petition, EPA properly recognized that an efficient solution to a GHG emissions problem must involve other major emissions-producing countries, and not

just the United States, and must not be confined to a single sector. Pet. App. A71-A74, A82, A85-A86.

A brief review of worldwide GHG production shows the logic in the EPA's decision. In 2004, the United States produced 21.9 percent of estimated worldwide manmade carbon dioxide emissions.[6] China produced 17.4 percent and Russia produced 6.2 percent.[7] Although the United States is currently the largest producer worldwide of GHG, that status will soon change. If current trends hold, China will be the largest producer of GHGs by the year 2015.[8]

Furthermore, GHG production is not limited to an individual sector of an economy. In particular, transportation produced only 26.8 percent of U.S. GHG emissions in 2002.[9] Transportation was not even the sector that contributed the most to GHG emissions in 2002. The most significant contributor to GHG emissions in 2002 was electricity generation, which was responsible for 33 percent of emissions.[10] Moreover, the carbon dioxide emissions from fossil fuels that were *not* produced by transport vehicles contributed to 49.4 percent of US GHG emissions.[11] By comparison, carbon dioxide

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[6] ENERGY INFO. ADMIN., INT'L ENERGY ANNUAL (2004), http://www.eia.doe.gov/emeu/iea/carbon.html, Table H.1co2 ("World Carbon Dioxide Emissions from the Consumption and Flaring of Fossil Fuels (Million Metric Tons of Carbon Dioxide), 1980-2004").

[7] *Ibid.*

[8] See ENERGY INFO. ADMIN., PROJECTED INT'L CARBON DIOXIDE EMISSIONS FROM ENERGY USE TO 2030 (REFERENCE CASE) (2006), http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_10.pdf.

[9] U.S. EPA, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS & SINKS: 1990-2002 (2004) table 2-6, at 2-8 to 2-9, http://yosemite.epa.gov/oar/globalwarming.nsf/content/ResourceCenterPublicationsGHGEmissionsUSEmissionsInventory2004.html.

[10] *Ibid.*

[11] *Ibid.*

emissions from fossil fuels from the transportation sector produced 25.4 percent.[12]

Consequently, because the emission of GHGs is not only a multi-country problem but also a multi-sector problem, it was reasonable for EPA to decline to address the issue through the tailpipe emission standards sought by petitioners before the agency.

II. CONTROLLING CARBON DIOXIDE EMISSIONS THROUGH CAFE STANDARDS OR ZERO-EMISSION-VEHICLE MANDATES WOULD PRODUCE A HOST OF ADVERSE CONSEQUENCES.

As noted above (page 6, note 5, *supra*), petitioners before the EPA focused their arguments on regulation to control carbon dioxide emissions, and urged the use of CAFE standards and ZEV mandates to control such emissions.[13]

Both of these approaches present a myriad of economic problems, including serious adverse consequences.

A. The Use Of CAFE Standards Would Produce Several Adverse Consequences.

In the denial of the petition for rulemaking, EPA observed that "the only practical way to reduce tailpipe emissions of CO_2 is to improve fuel economy." Pet. App. A79.

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[12] *Ibid.*

[13] The petitioners before EPA also urged the agency to take steps to encourage the "market penetration" of hybrid vehicles – that is, vehicles "combining a gasoline-powered engine and a battery-powered electric motor." JA 38, 39. The only method that the petitioners proposed for enhancing the "market penetration" of hybrids, however, was the "setting of new § 202-based CAFE standards by the EPA." *Id.* at 39. Thus, the concerns that we raise in subsection A, *infra*, about the adverse consequences of new CAFE standards also apply to the petitioners' proposal that EPA take steps to encourage the marketability of hybrid vehicles.

Therefore, the regulation of carbon dioxide emissions would, in all probability, involve new CAFE standards.

Existing "CAFE" standards are set forth under the federal motor vehicle fuel economy program authorized under Title III of the Energy Policy Conservation Act ("EPCA"), Pub. L. No. 94-163, 89 Stat. 871, 901, et seq. (1975) (now codified at 49 U.S.C. § 32901, *et seq.*). The program is administered by the National Highway Traffic Safety Administration ("NHTSA"), a unit of the United States Department of Transportation. NHTSA has administered CAFE standards under the program for light duty motor vehicles for more than two decades. These CAFE standards establish average fuel economy levels that must be met by each vehicle manufacturer's fleet. The average fuel economy for each fleet is calculated under "testing and calculation procedures prescribed by the Administrator" of EPA. 49 U.S.C. § 32904(c). EPA's procedures call for measuring certain exhaust emissions, including carbon dioxide. The carbon dioxide emissions are measured in terms of grams of carbon dioxide per mile, and then converted into miles per gallon, according to a formula in EPA's regulations. 40 C.F.R. § 600.113-93(e). With this information, EPA computes each manufacturer's fleet average fuel economy in miles per gallon, and reports the results to NHTSA. 49 U.S.C. § 32904(e).

CAFE standards create a host of well-documented adverse consequences. One such consequence is known as the rebound effect. The rebound effect states that, by reducing driving costs, fuel economy standards actually encourage more driving and thereby increase congestion, pollution, and traffic accidents.[14] Such additional driving also would likely increase the emissions of GHGs.

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[14] *See, e.g.*, David L. Greene, *Vehicle Use and Fuel Economy: How Big is the "Rebound" Effect?*, 13 ENERGY J. 117, 118 (1992); David L. Greene, James R. Kahn & Robert C. Gibson, *Fuel Economy Rebound Effect for U.S. Household Vehicles*, 20 ENERGY J. 1, 1-2 (1999); Clifton T. Jones, *Another Look at U.S. Passenger Ve-*

The size of the rebound effect is considerable. Economists have estimated that the rebound effect is large enough to undermine the effectiveness of CAFE standards by between 10 and 30 percent.[15] That is, a 100 percent improvement in the fuel economy of the vehicle fleet would result in a 10 to 30 percent "rebound" in the form of additional miles driven. When added to the additional damage of increased congestion and traffic accidents, it is clear that the goal of CAFE standards is significantly undermined by the existence of the rebound effect.

Another adverse consequence of CAFE standards is the fact that they increase the cost of new vehicles. This, in turn, provides incentives for individuals to delay the purchase of new vehicles and continue driving their older vehicles, which could have adverse economic consequences for various parts of the automobile sector. Moreover, any delay in purchasing new vehicles also delays the achievement of the environmental benefits associated with newer vehicles that are produced with new technologies that decrease emissions.[16] Therefore, CAFE standards can actually increase the level of emissions produced by vehicles, particularly in the short-run.[17]

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hicle Use and the 'Rebound Effect' from Improved Fuel Efficiency, 14 ENERGY J. 99, 99 (1993) (discussing that the rebound effect results in an increase in vehicle miles traveled).

[15] Lorna A. Greening, David L. Greene & Carmen Difiglio, *Energy Efficiency and Consumption—the Rebound Effect—a Survey*, 28 ENERGY POL'Y 389, 398 (2000) (table 3).

[16] See, *e.g.*, Howard K. Gruenspecht, *Differentiated Regulation: The Case of Auto Emissions Standards*, 72 AM. ECON. REV. PAPERS & PROC. 328, 330-331 (1982); ROBERT W. CRANDALL, HOWARD K. GRUENSPECHT, THEODORE E. KEELER & LESTER B. LAVE, REGULATING THE AUTOMOBILE 89-90 (1986).

[17] See, *e.g.*, Gruenspecht, *Differentiated Regulation, supra* note 16, at 331 (more stringent emissions standards for CO, NO_x, and HC in 1981 resulted in a short-run increase in the production of those

Still another potential consequence of CAFE standards is their effect on vehicle safety, although this effect is still contested. Economists have argued that one approach that vehicle manufacturers can use to meet CAFE standards is a reduction in the weight of the vehicles they produce.[18] Lighter vehicles, on average, are linked with greater instances of injury or death when vehicle accidents occur.[19] Opponents of this argument, however, state that it is unclear whether the majority of vehicle weight reductions from CAFE standards result in a conversion from mid-sized cars to small cars (which could increase fatalities) or cause manufacturers to limit the production of their largest cars and light trucks (which could actually improve overall vehicle safety).[20]

Nevertheless, it is clear that CAFE-like standards pose a great risk of producing detrimental consequences. Thus, EPA would be entirely justified in refusing the petitioners' request to promulgate them as a means of restricting the emission of carbon dioxide from motor vehicles.

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emissions in certain areas); Robert N. Stavins, *Vintage-Differentiated Environmental Regulation*, 25 STAN. ENVTL. L.J. 29, 48-49 (2006) (regulations that impose standards for new automobiles depress sales and have "extended the useful lives of cars on the road, and therefore can increase aggregate emissions," thereby compromising the cost-effectiveness of such regulations; therefore, "alternative regulatory approaches merit ongoing exploration").

[18] Robert W. Crandall & John D. Graham, *The Effect of Fuel Economy Standards on Automobile Safety*, 32 J.L. & ECON. 97, 97 (1989).

[19] *Id.* at 98.

[20] Paul R. Portney, Ian W.H. Parry, Howard K. Gruenspecht & Winston Harrington, *The Economics of Fuel Economy Standards*, 17 J. ECON. PERSPECTIVES 203, 211-212 (2003).

B. Zero-Emission-Vehicle Requirements Also Would Produce Adverse Consequences

A ZEV-mandate also would produce a number of adverse consequences, the most problematic of which would be likely net *increases* in the emissions of non-GHG pollutants. In fact, the category "zero emissions vehicle" is a misnomer: ZEVs *do* produce emissions, just not from the tailpipe. Thus, electric cars – the only ZEV yet to be produced on any wide-scale basis – produce significant amounts of pollutants resulting from the production of electricity, because their batteries must be recharged.[21] Once an electric car's battery is drained, the car requires significant quantities of electricity before it can be driven, and that electricity is generally produced by a fossil fuel or nuclear generation unit.[22] In addition, the lead-acid batteries used in ZEVs pose risks of increased emissions of lead and other toxic metals and will require the processing and recycling of many times more lead than is found in conventional vehicles.[23]

In addition to the increased non-GHG pollutants associated with ZEVs, a ZEV mandate also would provide great incentive for consumers to retain their older combustion engine vehicles for longer periods of time. When estimating the effect on net pollution from California's mandate for the sale of ZEVs, Howard Gruenspecht found that California's ZEV mandate would substantially increase vehicle emissions of reactive organic gases and nitrogen oxides, on net.[24] In particular, he found that the increase in such emissions from the

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[21] GAO, *Electric Vehicles: Likely Consequences of U.S. and Other Nations' Programs and Policies,* PEMD-95-7, Dec. 30, 1994, at 111.

[22] *Ibid.*

[23] *Cf.* Howard Gruenspecht, *Zero Emission Vehicles: A Dirty Little Secret*, RESOURCES, Winter 2001, at 7, available at http://rff.org/rff/Publications/Resource_Articles.cfm.

[24] See *id.* at 8.

increase in the retention of existing vehicles would be between 3 and 15 times greater than the decrease in emissions enjoyed from ZEVs.[25]

In summary, a ZEV mandate also would produce significant adverse consequences. Thus, EPA's policy judgment not to promulgate such a mandate was a reasonable exercise of the agency's discretion.

III. THE STANDARD-SETTING REGULATIONS PROPOSED BY PETITIONERS BEFORE EPA WOULD YIELD LOWER NET BENEFITS THAN OTHER REGULATORY ALTERNATIVES.

The petition for rulemaking sought regulation under Section 202(a) of the Clean Air Act, which requires EPA in specified circumstances to regulate by setting "standards" for emissions of pollutants from new motor vehicles. See Petition for Rulemaking, JA 5, 6-7, 15, 16, 21-44; see also Pet. Br. 3 ("In 1999, the International Center for Technology Assessment and other parties petitioned EPA to set standards for four chemicals emitted by new motor vehicles: carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons").

As this Court has recognized, under Title II of the CAA, which includes Section 202(a), "standards" refers to "requirements such as numerical emission levels with which vehicles or engines must comply, or emission-control technology with which they must be equipped." *Engine Mfrs. Ass'n* v. *South Coast Air Quality Mgmt. Dist.*, 541 U.S. 246, 253 (2004) (citations omitted; citing subsections 202(a)(3)(B)(ii) and 202(a)(6)).

As noted above, the petitioners before EPA primarily sought standards-setting regulations in the form of CAFE requirements or a ZEV mandate. See page 6, note 5, *supra*. The CAFE and ZEV mandates proposed by the petitioners before EPA would involve the imposition of performance standards.

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[25] *Ibid.*

In general, regulation through performance standards is preferable to regulation by means of design standards.[26] See, *e.g.*, CASS R. SUNSTEIN, RISK AND REASON: SAFETY, LAW, AND THE ENVIRONMENT 270 (2002) ("A 'performance standard,' telling people (for example) to reduce sulfur dioxide emissions to a certain level, is better than a technology requirement [*i.e.*, design standard] simply because it is more flexible and allows companies to meet the standard as they choose").

Nevertheless, despite the general superiority of performance standards to design standards, there can be still more cost-effective ways to regulate, depending on the circumstances. For instance, a carbon tax or marketable permits for carbon reduction both are likely to be more cost-effective approaches to controlling carbon dioxide emissions than would CAFE regulations or a ZEV mandate. As Professor Sunstein notes in connection with the use of tax schemes for regulating pollutants,

> [b]ut much of the time, a still better approach [than performance standards] is to impose a tax on harmful behavior and to let market forces determine the response to the increased cost. In many settings, the best approach is for government to impose fees on those who put pollutants into the atmosphere. Consumption of the harm-producing good will decline. People will, for example, be less likely to use high-polluting gasoline; emissions of carbon dioxide, the leading contributor to global warming, will decline.

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[26] For the distinction between performance standards and design standards in the context of motor vehicle regulation, see *DePaepe* v. *General Motors Corp.*, 141 F.3d 715, 718 (7th Cir. 1998) ("Design standards specify what a component of a vehicle must be; performance standards specify what the component must accomplish").

SUNSTEIN, RISK & REASON, *supra*, at 270.[27]

The use of alternative incentive-based regulatory approaches would afford regulated entities greater flexibility than would the performance standards advocated by the petitioners before EPA. Such approaches would be likely to yield higher net benefits than would CAFE regulations or a ZEV mandate. For example, these alternative approaches could be more cost-effective than CAFE regulations or a ZEV mandate by achieving the same overall level of emissions reductions for carbon dioxide at a lower cost. In these circumstances, EPA's rejection of the petition seeking to force it to impose CAFE or ZEV regulation was not arbitrary or capricious but perfectly reasonable.[28]

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[27] See also William J. Baumol, *On Taxation and the Control of Externalities*, 62 AM. ECON. REV. 307, 319 (1972) (a system based on specified standards for pollutants and taxes on emissions would "avoid[] direct controls with all of their heavy administrative costs and their distortions of consumer choice and inefficiencies"; "unlike any system of direct controls, it promises, at least in principle, to achieve decreases in pollution or other types of damage to the environment at minimum cost to society"); Warwick J. McKibbin & Peter J. Wilcoxen, *The Role of Economics in Climate Change Policy*, 16 J. ECON. PERSPECTIVES 107, 107 (2002) ("hybrid policy, combining the best features of" a tradable permit system and an emissions tax "would be an efficient and practical approach" to climate change regulation). For a discussion of economically efficient climate change policies in a global context, see WILLIAM D. NORDHAUS & JOSEPH BOYER, WARMING THE WORLD: ECONOMIC MODELS OF GLOBAL WARMING 121-144 (2000).

[28] See, *e.g.*, Andrew W. Kleit, *Impacts of Long-Range Increases in the Fuel Economy (CAFE) Standard*, 42 ECON. INQUIRY 279, 293 (2004) ("increases in CAFE standards above current levels are neither cost-effective nor cost-beneficial" and would amount to "12 times the cost of a gasoline tax increase that would save the same amount of fuel"); *cf.* McKibbin & Wilcoxen, *supra* note 27, at 127 (criticizing as "deeply flawed" policies that set "rigid targets and timetables for emissions reductions" and commending a more

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In sum, EPA acted reasonably in rejecting the petitioners' request for CAFE regulations or a ZEV mandate to address emissions of carbon dioxide from motor vehicles. The emission of GHGs is not only a multi-country problem but also a multi-sector problem. In addition, the regulations sought by the petitioners before EPA could produce a number of adverse consequences. Incentive-based mechanisms, such as carbon taxes or marketable permits, would likely be more cost-effective than CAFE regulations or a ZEV mandate, and merit further consideration.

CONCLUSION

The decision of the court of appeals should be affirmed.

Respectfully submitted.

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flexible approach, such as one that combines tradable permits with an emissions tax).